

Nacelle Design

In the photo, production line workers at Rohr Industries, Inc., Chula Vista, California are installing engine nacelles for the McDonnell Douglas DC-9 jetliner; the nacelle assembly includes the cowlings shown in foreground, the exhaust nozzle and other components, and the outer skin enclosing the whole engine. Although seemingly a simple component, the nacelle requires considerable research and development for each type of airplane because of complex airflows around the engine inlet and high pressures on the nacelle skin.

In its research work, Rohr Industries has made extensive use of a COSMIC computer program, developed by McDonnell Douglas under contract with

Lewis Research Center, which defines the airflow field around turbofan engine nacelle inlets and cowls. The pressures on the nacelle skin are estimated for various flight conditions and this data helps stress analysts confirm the structural integrity of the nacelle design. Rohr estimates that use of the COSMIC program saved six man-months of programmer time necessary to develop alternative software.

Rohr Industries, specialists in manufacture of nacelles, thrust reversers and other engine components, made use of the COSMIC program in nacelle work for such aircraft as the McDonnell Douglas DC-10, the French/German Airbus, and the Boeing 727, 737 and 747 jetliners. Rohr also manufactures complete nacelles for military and business aircraft and is supplying nacelle components for the new Boeing 757.

